SPECIAL NOTICE - NOTICE OF INTENT

Please join the National Energy Technology Laboratory's (NETL) Gasification Technologies Procurement Strategy Team in a pre -Funding Opportunity Announcement Conference to be held on January 22, 2007 at 9:30 a.m. at the following location:

US Department of Energy
National Energy Technology Laboratory
Conference Room 922C
626 Cochrans Mill Road
Pittsburgh, PA 15236

The purpose of this meeting is to discuss potential cooperative research and development that will help the DOE Gasification Technologies Program achieve its strategic objectives and programmatic goals. The desired research and development concepts for this announcement are limited to improvements in gasifier island technologies (coal feed system, gasifier, synthesis gas cooling, and air separation unit) that lead to reduced capital costs, reduced operating and maintenance costs, improved process environmental performance, enhanced thermal efficiency, and/or increased process reliability and flexibility.

Topics to be discussed are (a) Desired Technologies and Examples; (b) Excluded Technologies, and (c) Application requirements. They are described below:

a. Desired Technologies and Examples

The DOE is interested in any technology, except those described as being excluded in the next section, which will move coal gasification forward in terms of the reduced capital costs, reduced operating and maintenance costs, improved process environmental performance, enhanced thermal efficiency, and/or increased process reliability and flexibility. There exist many opportunities within the gasification island where improvements in cost and process performance and reliability can be achieved through the development of new processes and/or materials. The value of a proposed concept will be: it's potential to make improvements over current commercial technologies, its potential to succeed, it's potential to compete successfully with other technologies being developed, and the estimated cost and time to become commercially viable. Examples are provided below:

- Development of Alternative Heat Recovery Systems.

  Cooling of the synthesis gas from gasifiers has a significant impact on the overall cost and performance of a gasification-based plant. First stage high temperature heat recovery (such as use of radiant coolers) is expensive, and fouling of the synthesis gas convective heat recovery unit has adversely impacted plant reliability. Alternative heat recovery systems that are less expensive and more reliable are needed. An improved understanding of the chemistry of the fouling

and its impact on system design could lead to mitigation strategies through new design concepts and/or process modifications. Strategies/concepts must integrate with operation of humid gas cleaning (operations at temperatures and pressures above the dew point of water, approximately 350-500°F) for contaminant removal. Solutions may include additives and/or materials improvements, or novel processes.

- Development of Efficient Air Separation Systems

  For oxygen-blown gasification applications, conventional air separation units are both costly and energy intensive. Development of an efficient air separation process/device would offer substantial improvements by eliminating the extreme process conditions associated with cryogenic technologies. Of particular interest are technologies that minimize efficiency losses upon integration with the rest of the gasification plant.

- Development of High Pressure Feed System Technologies

  Development of high pressure (up to ~ 1000 psi) coal feed system technologies (e.g. dry feed systems or CO_2 slurries) to improve reliability and/or decrease cost over conventional high pressure feed systems is sought. Development of feed systems that are fuel flexible to include all ranks of coal without feed preprocessing is also desired.

- Development of New Materials

  Development of new materials (e.g., gasifier refractory material) that improve system reliability and decrease capital, operating and maintenance costs is of interest. Applications offering the potential for reliability improvements without significantly increasing capital cost are desired.

- Novel Concepts/Technologies

  Any novel concept or technology with the potential to reduce capital costs; operating and/or maintenance costs; improve process environmental performance; enhance thermal efficiency; improve process flexibility; and/or increase process reliability, availability and maintainability is sought. An example would be the novel integration of two or more traditional coal gasification process steps/functions to reduce capital costs or increase gasifier island availability.

b. Excluded Technologies

The DOE does not intend to accept applications in the following technologies:

- Novel gasifier concepts.
- Chemical looping concepts.

- Gas cleanup technologies to remove syngas impurities (e.g., sulfur, heavy metals), including particulates.
- Technologies related to turbines, fuel cells, and hydrogen/carbon dioxide separation processes.
- Cryogenic and ion transport membrane air separation.
- Concepts for feedstocks with more than 25% of its energy value from fuels other than coal.
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For discussion purposes the tentative Application Requirements are outlined below:

c. Application Requirements

Responsive applications are those which address the objectives of the Funding Opportunity Announcement that will be issued on or about January 31, 2007. The successful application must: 1) Show the potential for the technology/concept to make progress towards reducing capital costs, reducing operating and maintenance costs, improving process environmental performance, enhancing thermal efficiency, and/or increasing process reliability/availability/maintainability, 2) Describe how the project will be successfully completed, 3) Justify the adequacy of the project team and facilities to successfully complete the project, and 4) Include the specific information described below.

Scientific and Technological Merit: The applications must include sufficient technical information and background to permit an evaluation of the project merit. The following factors will be considered:

- The technology/concept must be described through a clear discourse displaying knowledge of gasification processes and industry needs, and the degree to which the proposed work is based on sound scientific and engineering principles and/or past work. Other related government-funded work performed by the Applicant must be described.

- A techno-economic evaluation must be provided that demonstrates the level and type (cost, reliability, efficiency, etc.) of improvement possible through incorporation of the new technology/concept. The improvement must be quantified as compared to a base case of cryogenic air separation, slurry-fed GE gasifier (or dry-feed Shell gasifier, as most appropriate), and MDEA/Selexol syngas cleanup. All input to the techno-economic analysis, assumptions, data, etc., must be specified in a table showing what the input is, justifying why it is reasonable, and citing all applicable references.

Technical Approach: The technical methodology for the project must include a phased approach with logical decision criteria being utilized to define go/no-go points and the associated budget periods. The technical approach shall include the following.

- Phase I: The first phase of the project will be limited to:

- A techno-economic assessment shall be made to show how the new technology/concept will contribute to reducing capital costs, reducing operating and maintenance costs, improving process environmental performance, enhancing thermal efficiency, and/or increasing process reliability/availability/maintainability. The assessment shall be developed in accordance with NETL's Quality Guidelines for Energy Systems Studies (http://www.netl.doe.gov/publications/others/pdf/QGESS%20-%209-30-03_3_1.pdf). Assumptions must be specified and justified. The assessment must result in identification of technology development barriers, especially those that will be removed/mitigated by subsequent experimental work.
- A risk assessment shall be developed to identify issues and barriers, and to identify risk mitigation strategies. These risks must include risks to successful technology development and risks to the eventual benefit of the technology/concept.
- Key research shall be conducted to validate to the extent possible the techno-economic analysis, to minimize risk and to develop needed information to better define R&D for subsequent phases.
- Based on the results of Phase I activities, the R&D work plan for the remainder of the project shall be refined.

- Overall Project R&D Plan: Although the work plan for the remainder of the project may change after Phase I, and will certainly increase in level of detail, the application must include:
  - Current plan for <u>all</u> phases of the project.
  - The cost estimate for <u>all</u> phases of the project.
  - Strategy for incorporating the results of Phase I into the work plan for subsequent phases.
  - Refinement of the techno-economic assessment throughout the life of the project, and strategy for incorporating assessment results into the technology development decision making process.
  - The experimental program shall ultimately evaluate the proposed technology/concept with real coal syngas (75% coal on an energy basis, e.g., for heat recovery concepts) or under conditions closely simulating the intended commercial gasification environment, as applicable for the proposed technology.
  - A description of technology driven decision points.

- Project Schedule: A schedule for the whole project by task, including decision points, preferably in the form of a Gantt chart.

- A plan for continued development/commercialization of the technology at the end of the project, including:

- The degree to which technology will be ready for commercialization or demonstration/development through integration with a coal gasification test site.
- A transfer plan for commercialization of proposed technology by the gasification industry.

The strongest applications will be those that end with the technology in a position to be easily transferred to the market place -- a process which is typically expedited when industry participants are included in technology development.

Technical and Management Capabilities: This section of the application must show the capability of the proposed project team, facilities and equipment to successfully support project completion.

- Describe the Applicant's organization's capability and experience in managing projects that meet project objectives, within budget and on schedule. This will be determined in part by the clarity, logic and likely effectiveness of project organization, including subcontractors, as demonstrated in the application.

- Provide the technical credentials, capabilities and experience of key personnel, including applicable subcontractors, as they pertain to the proposed technology and the appropriateness of the proposed level of effort for each key person and support staff.

- Describe the adequacy and availability of the proposed facilities and equipment to support the work plan.

GENERAL INFORMATION

Potential Offerors need not be present at the Pre-Funding Opportunity Announcement Meeting in order to submit an application.

Based upon the outcome of this meeting, the DOE intends to issue this Funding Opportunity Announcement on or about January 31, 2007 and anticipates a total Federal Funding of $10-15M. Under this announcement, DOE expects to make 1 – 6 financial assistance (Cooperative Agreement) awards. It is also anticipated that each award will be approximately $2M to $6M in DOE funding plus a minimum of 20% cost share. The estimated period of performance for the basic award is 3-5 years, including three budget periods or phases.

Point of Contact:

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The following outlines basic guidelines for NETL visitors. Please allow sufficient time to access the site prior to the scheduled conference.

- All visitors must notify the DOE Point of Contact (Edgar Klunder) by e-mail on or before January 18th, 2007 of their plans to attend the conference.
- All visitors must be U.S. citizens with proper photo identification.
- All visitors' vehicles and hand-carried items are subject to search.
- Visitors are not permitted to carry recording or photography equipment, including camera phones, in NETL facilities.
- All visitors must register at the reception desk located in Building 920, Reception (Pittsburgh) or the NETL Security Office.
- Visitors will be asked to complete a NETL Visitor Registration form NETL F 470.1-4 or NETL F 470.1-5 and given the Safety, Security, and Emergency Preparedness Orientation.
- The visitor will be issued a "Visitor's" badge upon completion of the Visitor Form.
- Visitors are to return their badges to the reception desk as they leave.